Severe calcification of the lateral mitral annulus in constrictive pericarditis: a potential pitfall for the use of echocardiographic tissue Doppler imaging

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According to the guidelines of the European Society of Cardiology on the diagnosis and management of pericardial diseases, tissue Doppler imaging (TDI) is proposed to be part of the diagnostic work-up in patients with suspected constrictive pericarditis (CP). We describe a case which illustrates that TDI analysis may be misleading in patients with severe pericardial calcifications of the lateral mitral annulus. Multi-slice computed tomography (MSCT) data in this case contributed much to a better understanding of the impact of heterogeneous calcification patterns on the results of TDI assessment in CP.

KEYWORDS
Constrictive pericarditis; Tissue Doppler echocardiography; Annular calcification; Multi-detector computed tomography; Mitral annulus; Restrictive cardiomyopathy

Case report
A 43-year-old woman presented with dyspnea (NYHA II-III), splenomegaly, and sonographic features of cardiac cirrhosis. Transthoracic echocardiography revealed typical features of constrictive pericarditis (CP), e.g. biventricular dilatation, an abnormal septal movement, and an increased transmitral and transtricuspidal respiratory variation.

Extensive annular calcification of the pericardium, especially at the lateral mitral annulus, was demonstrated by echo and multi-slice computed tomography (MSCT, Sensation Cardiac, Siemens, Germany) (Figure 1a and b). MSCT-based three-dimensional reconstruction showed an annular form of CP (Figure 2).

Systolic and diastolic velocities of the mitral annulus were assessed by TDI (GE Vingmed Vivid Five) with pulsed-wave Doppler demonstrating an E'-velocity of 9.5 cm/s at the lateral mitral annulus and a marked increase in E'-velocity of 22 cm/s at the septal portion of the mitral annulus. Colour Doppler TDI analysis confirmed the decreased E'-velocity at the lateral mitral annulus in relation to the velocity at the septal mitral annulus (Figure 3). A subtotal pericardectomy was performed.

Discussion
TDI analysis has been shown to be a valuable tool for the echocardiographic work-up in patients with restrictive left ventricular filling patterns allowing for a differentiation between patients with restrictive cardiomyopathy (RCM) and CP. An early diastolic velocity (E') of more than 8 cm/s at the lateral mitral annulus has been suggested for the diagnosis of CP with high sensitivity and specificity.1,2

Our case illustrates that TDI analysis may be misleading in patients with severe pericardial calcifications resulting in reduced velocities of the lateral mitral annulus only. Limitations of the TDI analysis in CP have been previously discussed,3,4 but to our knowledge this is the first case where TDI data are compared with MSCT findings. MSCT contributed much to a better understanding of the impact of heterogeneous calcification patterns on the results of TDI assessment in CP.

We recommend simultaneous assessment of the peak early diastolic velocities of the mitral annulus at several locations, at least at both the lateral and septal mitral

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annulus, to avoid misinterpretation of mitral annulus movement which may be caused by pericardial calcification and result in reduced excursions of the lateral mitral annulus.

References


Figure 3  TDI analysis (color mode) of the velocities of the septal and lateral mitral annulus, showing decreased systolic and diastolic velocities at the lateral mitral annulus in relation to the velocities at the septal mitral annulus.